

Also, in the case of flammable gases or vapours, there was no clear correlation between the amount of chemical involved and the number of fatalities.

Moreover, well-known mathematical models used for accident risk assessment appear to indicate that the radii of the areas potentially involved by "fireballs" or by "unconfined vapor explosive clouds." In general, hazardous clouds released into the air generally are described by a mathematical function whose first derivative decreases for increasing amounts of the material released. Lastly, a simple non-parametric, statistical analysis of the OECD data (1988) concerning more than 360 major accidents involving hazardous chemicals and materials recorded in member countries in the period 1971–1987, appear to indicate that the mortality rate attributable to accidents in ship transport (about 1% of the reported accidents and 10% of the reported fatalities) is higher than the one attributable to the categories (which do not appear significantly different) represented by road transport (about 10% of accidents and 20%, of fatalities), processing-use-production (about 30% of accidents and 1/3 of fatalities), and trans-shipment and pipeline transport (about 10% and 8% of accidents and 10% and 8% of fatalities, respectively). Storage and rail transport of hazardous chemicals (about of 18% of accidents in both cases and 8% and 5% of deaths respectively, seem to be characterized by a mortality rate which is lower than the previous ones.

Some tentative conclusions may be drawn from these data. First, the simple reference to a quantity threshold of hazardous chemicals cannot provide an exhaustive criterion for the identification of major risk plants; and evidently, the consideration of the possible human exposure patterns always is necessary. Second, well-known mathematical models and simple criteria indicate that in many cases, the radii of the areas possibly involved by clouds of hazardous chemicals may decrease slightly even if the quantity of hazardous substances involved decreases substantially. Lastly, many data indicate that the transport of hazardous chemicals may represent an important source of risk, at least similar to the one attributable to industrial activity involving the same chemicals.

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### Medical Management of Environmental Emergencies: Whose Job Is It?

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Technological emergencies affecting public health include acute urban air-pollution episodes, major fires, releases of chemicals from industrial plant or during transportation, and nuclear accidents. The main, but not necessarily exclusive route of human exposure to the injurious agents involved is airborne, and so the issues surrounding the public-health risks of exposure and the medical management of those exposed or injured in these different types of incidents of the possible acute and chronic physical and mental health effects; provision of advice to the emergency services on the health risks to emer-

gency workers and the public; supplying information to the affected community and their medical attendants; and, in particular, advising on evacuation measures when the incident permits timely evacuation to take place. At present, training in emergency or public-health medicine does not equip physicians to undertake this role, but the need for expertise in the medical management of such technological incidents, and in environmental medicine in general (including developments in the UK on who should be doing it), will be shown by describing the lessons learned at a major plastics fire in Thetford, England. A simple model for predicting exposure, and hence the evacuation criteria on which to base decisions on evacuation of nearby communities in future fires of this type, also will be given.

033.

### Chemical Disarmament in Iraq: Notes on the Medical Support

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One of the conditions for a cease fire between Iraq and the coalition forces was the elimination of Iraq's weapons of mass destruction. For the chemical weapons, this meant a three stage process: Phase I—inspection and survey; Phase II—the disposal of weapons, facilities, and other related items through destruction, removal or rendering harmless; and Phase III—long-term monitoring to ensure ongoing verification.

The medical support of the small team of experts required a combination of general environmental and industrial medicine, toxicology, and emergency medicine. Due to the experimental character of the task, a lot of problems were identified only on the field. Lonely and a long way from home, the medical officer had to deal with those problems by staying calm, being supported by his knowledge of chemical warfare, clinical experience, and, not at least, by a good "home team" with access to the world's medical literature. To avoid dramatic situations, most of the time was spent on preventive actions and safe standard operational procedures.

079.

### Transportation of Dangerous Substances: Consequences of an Accident

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A simulated accident due to a fireball of liquid propane gas that developed from a 30-ton road tanker is described, and the stricken area is described.

Simulation models have been employed in order to assess the effects of the fireball. The models have been taken as a basis for determining the distances, for fixed values of thresh-